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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,556	04/03/2006	Yuji Tashiro	2003JP322	2066

26289 7590 06/21/2007

AZ ELECTRONIC MATERIALS USA CORP.
ATTENTION: INDUSTRIAL PROPERTY DEPT.
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EXAMINER
MCCALL SHEPARD, SONYA D

ART UNIT	PAPER NUMBER
2813	

MAIL DATE	DELIVERY MODE
06/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/574,556	TASHIRO ET AL.	
	Examiner	Art Unit	
	Sonya D. McCall-Shepard, PhD	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9 November 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the application filed on 3 April 2006.

Status of Application

2. Claims 1-20 are pending in this application.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4, 6, 7, 10, 12-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Tashiro (JP 2002-293941).

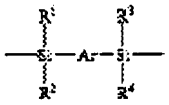
With regard to claim 1, Tashiro discloses a composition for formation of etching stopper layer, comprising a silicon-containing polymer, wherein 5% to 100% by mole, based on the total number of moles of silicon contained in the silicon-containing polymer in the composition of silicon is contained in a disilylbenzene structure (paragraph [0010]-[0012]).

With regard to claim 2, Tashiro discloses a silicon-containing polymer produced by polymerizing a compound having a disilylbenzene structure and an aromatic group-containing compound (paragraphs [0050]-[0057]).

With regard to claim 3, Tashiro discloses a silicon-containing material for formation of etching stopper layer, comprising a disilylbenzene structure formed by curing a silicon-containing polymer, wherein 5% to 100% by mole, based on total number of moles of silicon contained in the silicon-containing material, of silicon is contained in a disilylbenzene structure (paragraphs [0010]-[0012], [0050]-[0057]).

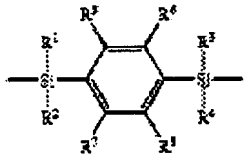
With regard to claim 4, Tashiro discloses a semiconductor device comprising, as etching stopper layer, a silicon-containing material for formation of etching stopper layer according to claim 3 (paragraph [0042]).

With regard to claim 6, Tashiro discloses a disilylbenzene structure represented by formula (I)



where R^1 to R^4 each independently are selected from hydrogen, an alkyl group, an alenyl group, a cycloalkyl group, an aryl group, an aralkyl group, an alkylamino group, and an alkylsilyl group, and Ar represents an aryl group (paragraphs [0010]-[0013]).

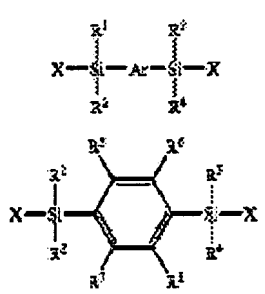
With regard to claim 7, Tashiro discloses a disilylbenzene structure represented by formula (II)



where R^1 to R^4 each independently are selected from hydrogen, an alkyl group, an alenyl group, a cycloalkyl group, an aryl group, an aralkyl group, an alkylamino group, and an alkylsilyl group; and R^5 to R^8 are independently selected from hydrogen, a C_1 to C_3 alkyl group, a halogen atom, a C_1 to C_3 alkoxide group, and a C_1 to C_3 amino group (paragraphs [0010] - [0013]).

With regard to claim 10, Tashiro discloses a comonomeric unit derived from a monomer selected from phenyltrichlorosilane, diphenyldichlorosilane, methyltrichlorosilane, and methylhydrodichlorosilane (paragraph [0062]).

With regard to claim 12, Tashiro discloses a compound having a disilylbenzene structure represented by formula (Ia) or (IIa)



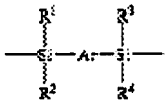
where R^1 to R^4 each independently are selected from hydrogen, an alkyl group, an alenyl group, a cycloalkyl group, an aryl group, an aralkyl group, an alkylamino group, and an alkylsilyl group, and Ar represents an aryl group and R^5 to R^8 are independently selected from hydrogen, a C_1 to C_3 alkyl group, a halogen atom, a C_1 to C_3 alkoxide

group, and a C_1 to C_3 amino group; and X's, which may be same or different, represented by a halogen atom or a hydroxyl group (paragraphs [0030] - [0031]).

With regard to claim 13, Tashiro discloses a compound having the silylbenzene structure selected from 1,4-bis(dimethylchlorosilyl)benzene, 1,4-bis(hydroxydimethylchlorosilyl)benzene and 1,4-bis(diethylshlorosilyl)benzene (paragraph [0051]).

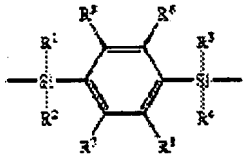
With regard to claim 14, Tashiro discloses an aromatic group containing a compound selected from phenyltrichlorosilane, diphenyldichlorosilane, methyltrichlorosilane, and methylhydrodichlorosilane (paragraph [0062]).

With regard to claim 15, Tashiro discloses a disilylbenzene structure represented by formula (I)



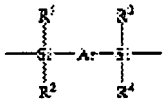
where R^1 to R^4 each independently are selected from hydrogen, an alkyl group, an alenyl group, a cycloalkyl group, an aryl group, an aralkyl group, an alkylamino group, and an alkylsilyl group, and Ar represents an aryl group (paragraphs [0010]-[0013]).

With regard to claim 16, Tashiro discloses a disilylbenzene structure represented by formula (II)



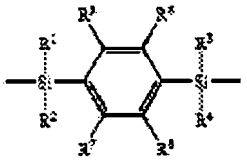
where R^1 to R^4 each independently are selected from hydrogen, an alkyl group, an alenyl group, a cycloalkyl group, an aryl group, an aralkyl group, an alkylamino group, and an alkylsilyl group; and R^5 to R^8 are independently selected from hydrogen, a C_1 to C_3 alkyl group, a halogen atom, a C_1 to C_3 alkoxide group, and a C_1 to C_3 amino group (paragraphs [0010] - [0013]).

With regard to claim 17, Tashiro discloses a disilylbenzene structure represented by formula (I)



where R^1 to R^4 each independently are selected from hydrogen, an alkyl group, an alenyl group, a cycloalkyl group, an aryl group, an aralkyl group, an alkylamino group, and an alkylsilyl group, and Ar represents an aryl group (paragraphs [0010]-[0013]).

With regard to claim 18, Tashiro discloses a disilylbenzene structure represented by formula (II)



where R^1 to R^4 each independently are selected from hydrogen, an alkyl group, an alenyl group, a cycloalkyl group, an aryl group, an aralkyl group, an alkylamino group, and an alkylsilyl group; and R^5 to R^8 are independently selected from hydrogen, a C_1 to C_3 alkyl group, a halogen atom, a C_1 to C_3 alkoxide group, and a C_1 to C_3 amino group (paragraphs [0010] - [0013]).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

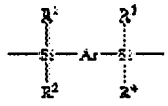
1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 5, 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tashiro (JP 2002-293941) in view of Babich et al. (US 5,141,817).

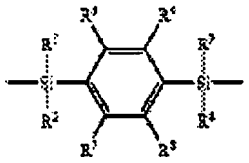
With regard to claim 5, Tashiro teaches an etching stopper layer formed by curing a composition comprising a silicon-containing polymer, wherein 5% to 100% by mole, based on the total number of moles of silicon contained in the silicon-containing polymer, of silicon is contained in a disilylbenzene structure. Tashiro does not teach a process for producing a semiconductor device, comprising the steps of: forming an insulating layer and an etching stopper layer on a substrate; removing part of the insulating layer by dry etching; and filling an electrically conductive material into a groove or hole thus formed. However, Babich et al. in figures 1-8 and related text teach a process for producing a device for electronic applications comprising the steps of forming an insulating layer (2) and an etching stopper layer (14) on a substrate; removing part of the insulating layer by dry etching (column 6, lines 2-4); and filling an electrically conductive material (24) into a groove or hole. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the process of Babich et al. with the structure of Tashiro. The motivation for doing so is to create a polyimide structure for electronic applications having electrical conductors embedded therein and a polymeric layer resistant to reactive ion etching as mentioned in Babich et al. column 1, lines 10-16.

With regard to claim 19, Tashiro discloses a disilylbenzene structure represented by formula (I)



where R^1 to R^4 each independently are selected from hydrogen, an alkyl group, an alenyl group, a cycloalkyl group, an aryl group, an aralkyl group, an alkylamino group, and an alkylsilyl group, and Ar represents an aryl group (paragraphs [0010]-[0013]).

With regard to claim 20, Tashiro discloses a disilylbenzene structure represented by formula (II)



where R^1 to R^4 each independently are selected from hydrogen, an alkyl group, an alenyl group, a cycloalkyl group, an aryl group, an aralkyl group, an alkylamino group, and an alkylsilyl group; and R^5 to R^8 are independently selected from hydrogen, a C_1 to C_3 alkyl group, a halogen atom, a C_1 to C_3 alkoxide group, and a C_1 to C_3 amino group (paragraphs [0010] - [0013]).

9. Claims 8, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tashiro (JP 2002-293941) in view of Uchimaru et al. (US 2002/0142533).

With regard to claim 8, Tashiro does not teach a polymer further comprising a comonomeric unit. However, Uchimaru et al. teach a polymer further comprising a comonomeric unit (paragraph [0008]). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the structure of Uchimaru et al. in the device of Tashiro. The motivation for doing so is to create a low-dielectric interlayer insulating film for use in ULSI devices in order to reduce parasitic capacitance.

With regard to claim 9, Uchimaru et al. teach a comonomeric unit comprising an aromatic group (paragraph [0008]-[0009]).

With regard to claim 11, Uchimaru et al. teach a composition further comprising an additional polymer (paragraph [0038]).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sonya D. McCall-Shepard whose telephone number is 571-272-9801. The examiner can normally be reached on Monday to Friday from 7:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/SDMS

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